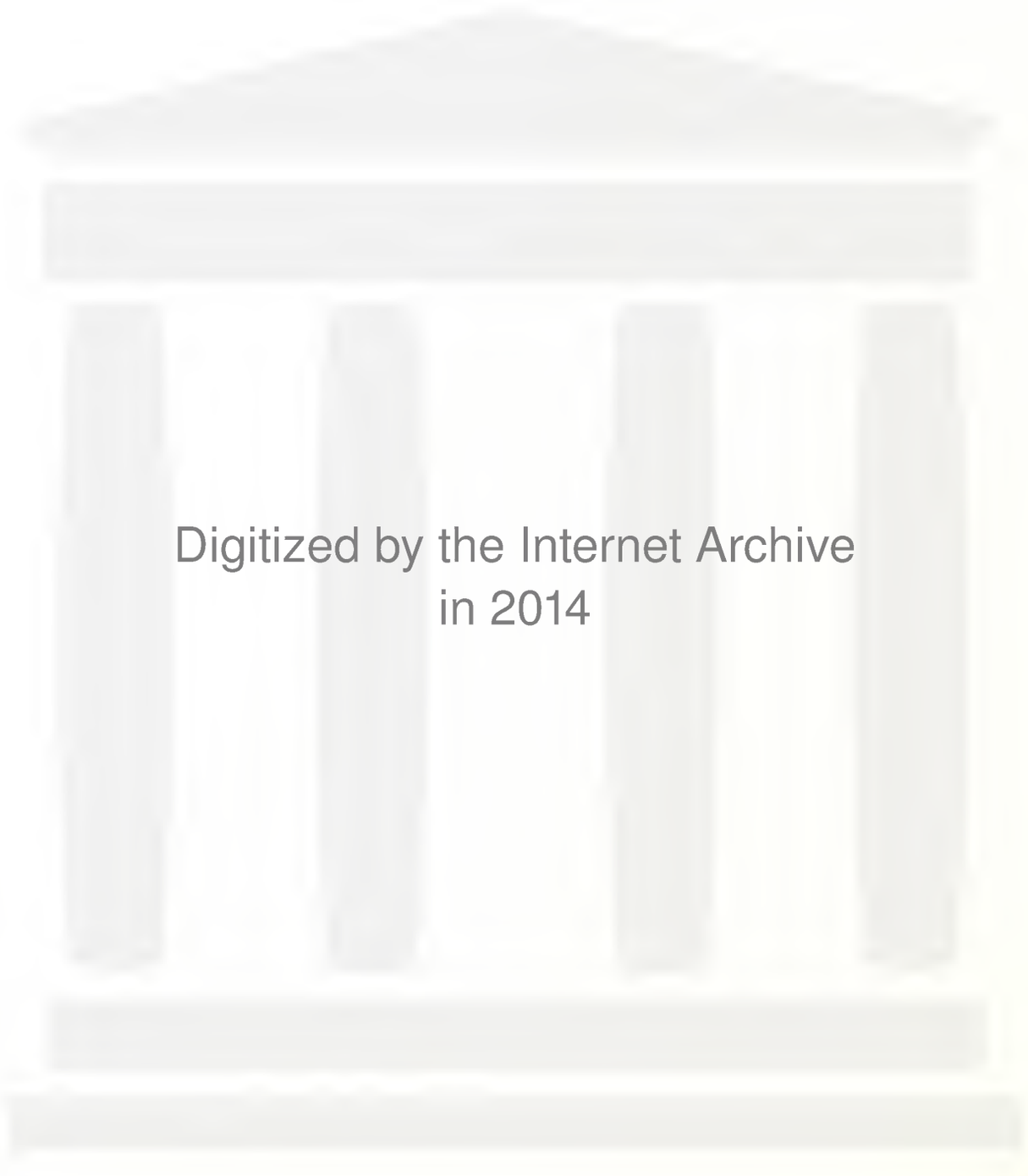
ISP

Organizing End-User Departments for Information Systems

INPUT®



ORGANIZING END-USER DEPARTMENTS FOR INFORMATION SYSTEMS

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CONTENTS

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FOR
INFORMATION SYSTEMS

EXHIBITS

I INTRODUCTION

A. PURPOSE

- This report is part of INPUT's Information Systems Program (ISP). It identifies the issues that information systems (IS) must address to provide the necessary leadership to realize the potential benefits of end-user involvement in systems development.

- The report answers the following questions:

  - What has caused the flurry of activity in end-user computing?

  - Where is the trend in end-user computing taking the information systems function?

  - What are the ramifications of end users developing their own systems with little or no direction from IS?

  - What steps can IS take to improve its credibility and assume the leadership role of all computing activities?

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I INTRODUCTION

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  - Where is the trend in end-user computing taking the information systems function?

  - What are the ramifications of end users developing their own systems with little or no direction from IS?

  - What steps can IS take to improve its credibility and assume the leadership role of all computing activities?

B. SCOPE

- This report will focus on the analysis of alternate approaches being used to manage and direct the phenomenon of end-user involvement in computing activities. It will examine the organizational ramifications of end-user computing from the viewpoints of both the corporate IS and the end-user departments. This report does not address the technical aspects of connecting hardware or downloading data bases. Instead, it deals primarily with tactical and strategic issues surrounding the entire information systems function.

- The following people should find this report pertinent:

  - IS managers.

  - IS planners.

  - End-user managers.

  - Senior corporate managers.

C. RELATED INPUT REPORTS

- Executive Workstation Acceptance: Problems and Outlook.

  - This report identifies executive computing requirements, analyzes products, and recommends executive computing support strategies.

- Supporting Personal Computer Software.

  - This report describes the planning and organizational issues of personal computer software support. It also provides a guide to maximizing the benefits of personal computer software.

- Organizing the Information Center.

  - A key issue is the extent to which the information center is complementary to, or an alternative for, the personal computer.

- The Opportunities of Fourth-Generation Languages.

  - Can fourth-generation languages help make the centralized mainframe competitive with the PC?

  - What role will current or future fourth-generation languages have on PCs?

- End-User Micro-Mainframe Needs.

  - This report concentrates on the experiences of organizations that use personal-computer-to-mainframe systems. It also identifies systems requirements and projects future effects.

- Micro-Mainframe: Telecommunications.

  - Analyzes, in detail, personal computer communications modes, their advantages and limitations, and how these communications are likely to change in the next two to three years.

- Training Techniques for End Users.

  - This report covers initial and on-going training and support for end users of personal computers, personal workstations, word processing, office systems, and information computing provided by IS.

- Future Skills Requirements for Software Development.

  - This report examines many of the latest productivity schemes to determine the impact the new methods are having on the skills mix of IS.

II EXECUTIVE SUMMARY

- This executive summary is given in presentation format to help the busy reader quickly review key research findings. It also provides an executive presentation, complete with script, to facilitate group communications.

  - The key points of the entire report are summarized in Exhibits II-1 through II-3. On the left-hand page facing each exhibit is a script explaining that exhibit's contents.

A. DISTRIBUTED SYSTEMS DEVELOPMENT WILL CHANGE THE I.S. ROLE

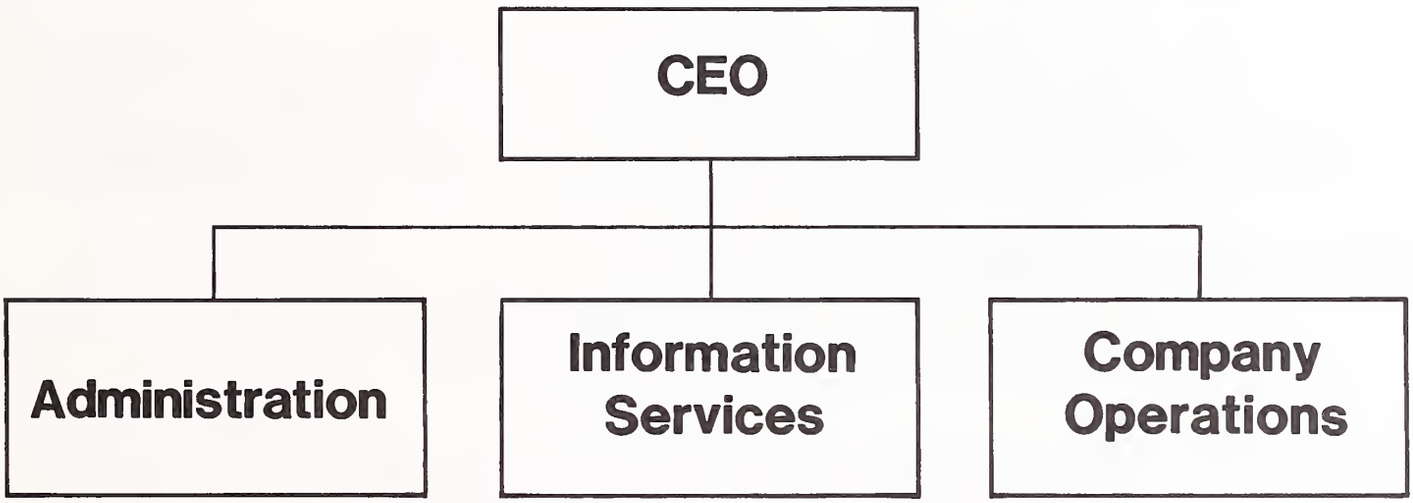
- As business operations throughout organizations in most industries install clustered intelligent terminals to handle the variety of computing tasks associated with the business functions, applications analysis and programming will be dispersed and under the control of line management. Personal computing, office systems, and transaction-driven systems will be developed by these local information systems groups.

- The more computing capabilities that are given to the work force of an organization, the more dependent that organization becomes on the technology to survive and thrive. This trend will push IS up the corporate ladder as the technical advisor. Computer capacity planning, data and voice communications, applications integration, education and training, corporatewide standards, and hardware and software consultation will become the main IS responsibilities.

- Future systems development at the local level will rely more heavily on fourth-generation languages, proprietary applications software, and program generators. IS will provide technical support and systems development consultation to ensure continuity and uniformity.

EXHIBIT II-1

DISTRIBUTED SYSTEMS DEVELOPMENT WILL CHANGE THE I.S. ROLE



- Applications Planning
- Technical Planning
- Standards
- Training and Education
- Communications
- Consultation
- Technical Support
- Data Center

- Applications Development
- Office Systems
- Personal Computing
- DDP

B. I.S. MUST ASSUME LEADERSHIP OF THE CORPORATE COMPUTING ACTIVITIES

- Because of the onrush of computing tools directed at the work force, there is a need for planning and controlling the use of these tools to ensure maximum benefits. Within an organization, IS is the only entity that has the technical know-how to manage the end-user computing phenomenon.

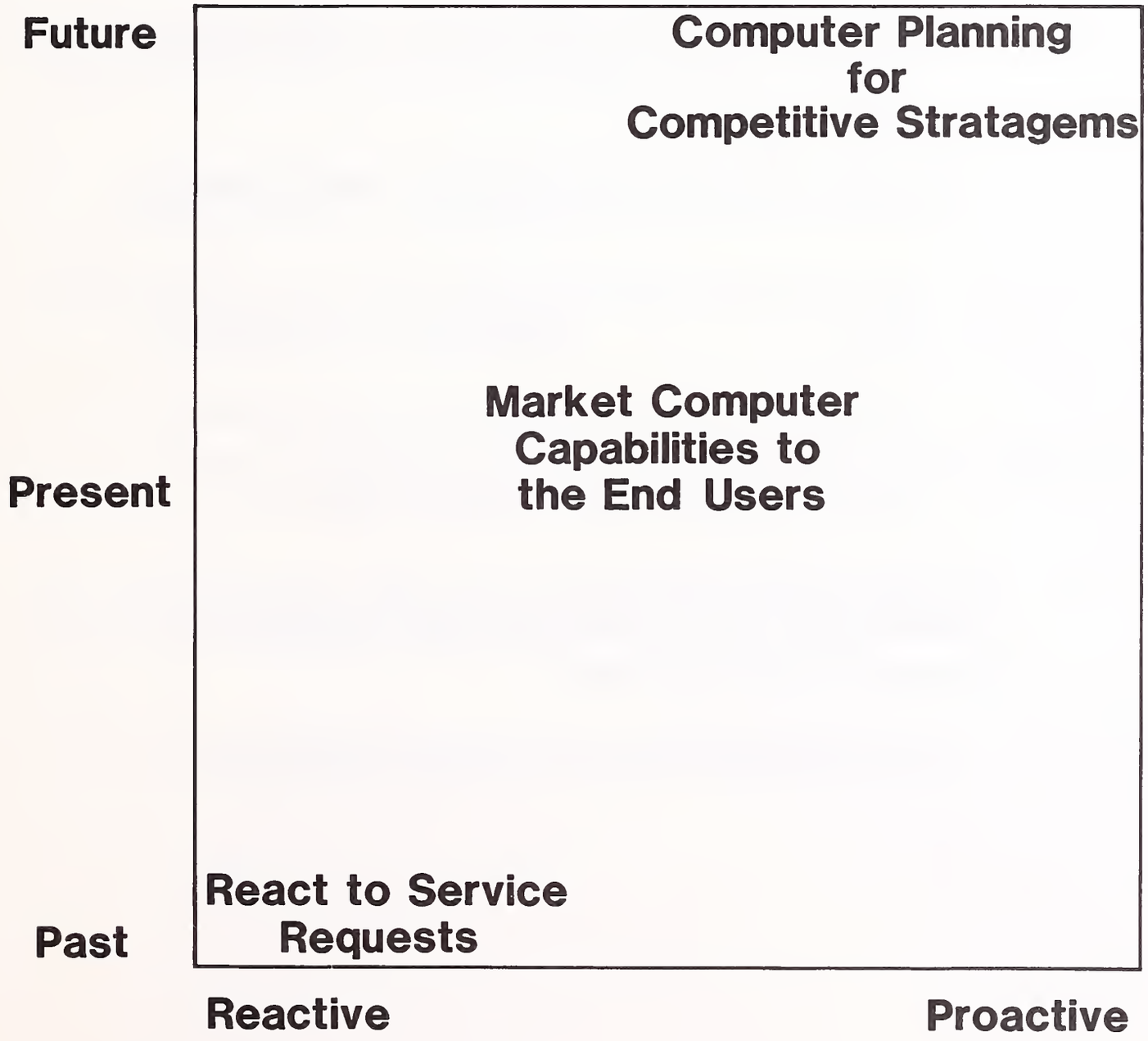
- Good leaders are influential and persuasive. IS must provide adequate computing alternatives, and then sell end users on the benefits of following IS's recommendations. This can be accomplished by expanding the information center to include the type of microcomputer products supported by IS. IS should also consider adding a marketing function to the information center to sell end users on the idea of using those products that are supported by IS and to sell end users on the benefits of seeking IS assistance.

- In the future IS will devote more of its energies to investigating innovations in computer applications that will assist the organization in becoming a leader in its field. Senior management will rely on IS to uncover competitive stratagems.

- IS is evolving from a service function that reacted to requests from end users to a proactive strategic planning function. During this evolution IS is helping end users to discover the capabilities of computer technology.

EXHIBIT II-2

I.S. MUST ASSUME LEADERSHIP OF THE CORPORATE COMPUTING ACTIVITIES



C. I.S. MUST ACCOMMODATE THE END USER

- Changing the primary role of IS from systems development to consulting is not going to happen overnight. This movement of computer resources toward the end user started with report program generators back in the 1950s and has progressed with terminal devices and micro technology.

- There are immediate steps IS can take to make certain that the end-user computing revolution is under control and on the right track to best serve the organization in meeting its goals and objectives. IS should:

  - Establish an end-user computing steering committee to set policy and approve plans.

  - Help the end-user community establish an internal users' group.

  - Issue an end-user computing reference manual with policies and practices.

  - Establish a center to provide information on microcomputers.

  - Offer training, tours, demonstrations, and consultation.

- End users must believe that IS is ready and able to accommodate their individual computing needs. This will happen only if IS has the tools available and the expertise to assist the end users.

EXHIBIT II-3

I.S. MUST ACCOMMODATE THE END USER

- End-User Computing Steering Committee
- End-User Computing Users' Group
- Reference Manual
- Microcomputer Center/Information Center
- Training, Tours, and Demonstrations
- Technical Support and Consultation

III ISSUES

A. I.S. CREDIBILITY

- One of the main reasons for the whirlwind of activity and interest in end users being able to solve some of their own information systems problems has been the lack of confidence in IS's ability to deliver. End users have become frustrated with empty promises from IS.

- IS has been a victim of circumstances and in most cases doesn't deserve the negative criticism. From the end users' standpoint, IS has been unresponsive to their individual needs.

- From the inception of digital computer technology in business, the main thrust of IS has been toward the transaction-driven systems. Senior management has demanded that IS resources be devoted to reducing operating costs and improving the production process. Applications development activity has been closely scrutinized to ensure a tangible return on the investment.

- Typical major systems have had two- to three-year development life cycles with many delays and missed target dates along the way. Project teams and management review boards have been formed to oversee these massive systems, but it always seems that IS gets the brunt of the blame for encountered problems.

- Probably the most common problem encountered during the development of a corporate system is the frequent requests from a variety of end users to change the specifications to meet some new-found information need. So many of these requests go unanswered, due to schedule constraints, that IS's credibility suffers.

- To the individual end user, IS appears to be a mountain of bureaucratic red tape, illustrated in Exhibit III-1.

B. USERS' DEMANDS

- Users' needs and wants haven't changed appreciably through the years. They have always had to exchange correspondence, prepare special reports for management, schedule and track projects, follow up on special requests, and manage their time. Those day-to-day functions listed on Exhibit III-2 have been the mainstay of line managers' duties from the beginning of business.

- During the past 25 years, when senior management wanted ad hoc information concerning the status of some business process within the company, the user (in this case, line management) would select bits and pieces of data from various sources, including computer reports, and laboriously analyze the data using desk calculators. Invariably, senior management would request additional information to compare and draw conclusions on which to base business decisions. Line management would request additional ad hoc reports from data processing, and this iterative process would continue until senior management had exhausted all combinations of data comparisons.

- Unfortunately, there are still companies in which the manual manipulation of data continues; the IS departments of those companies are inundated with requests for special reports. In such instances, IS has been unable to respond as quickly as top management desires, which of course makes middle

EXHIBIT III-1

END-USER'S VIEW OF THE I.S. MOUNTAIN

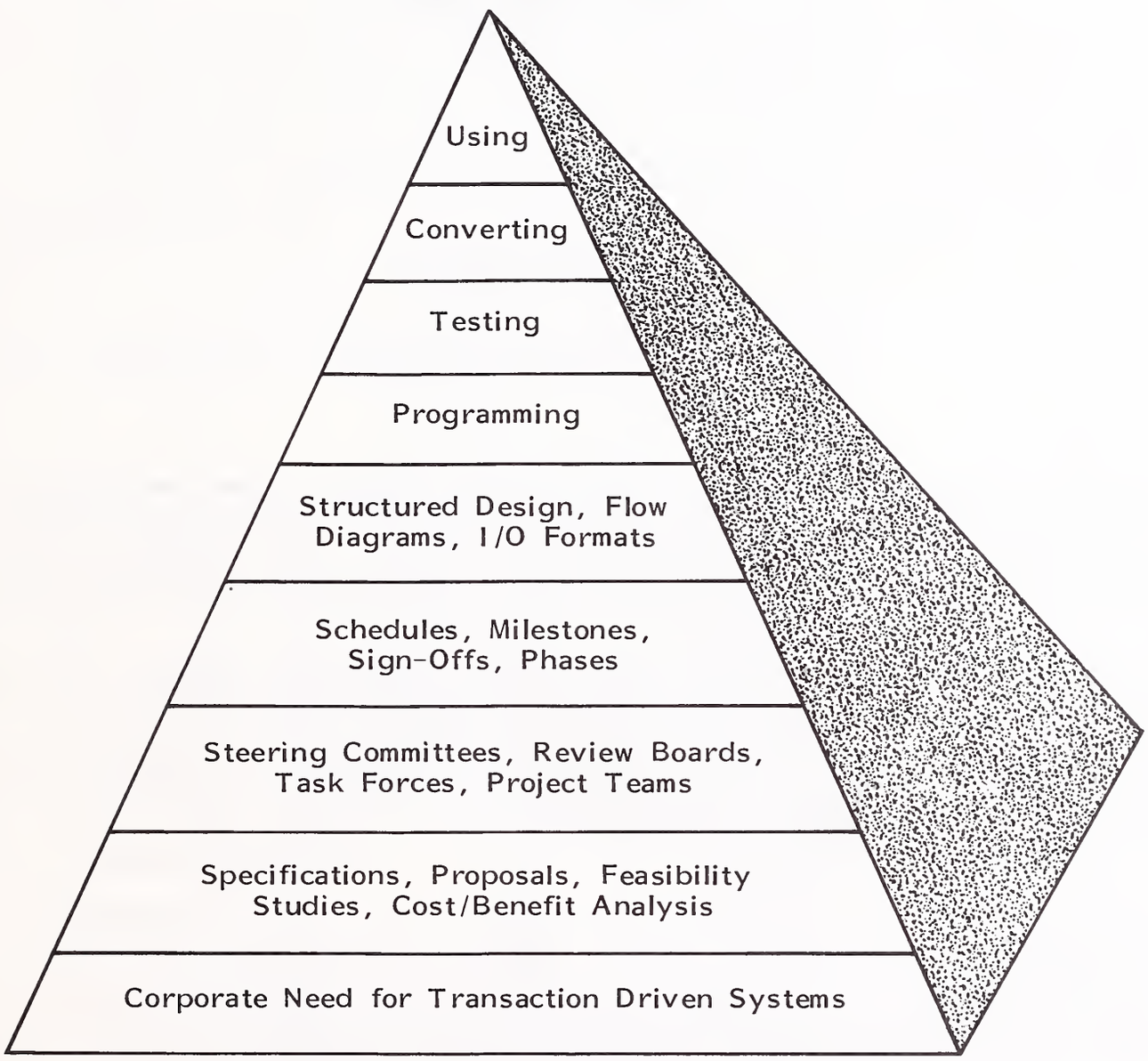
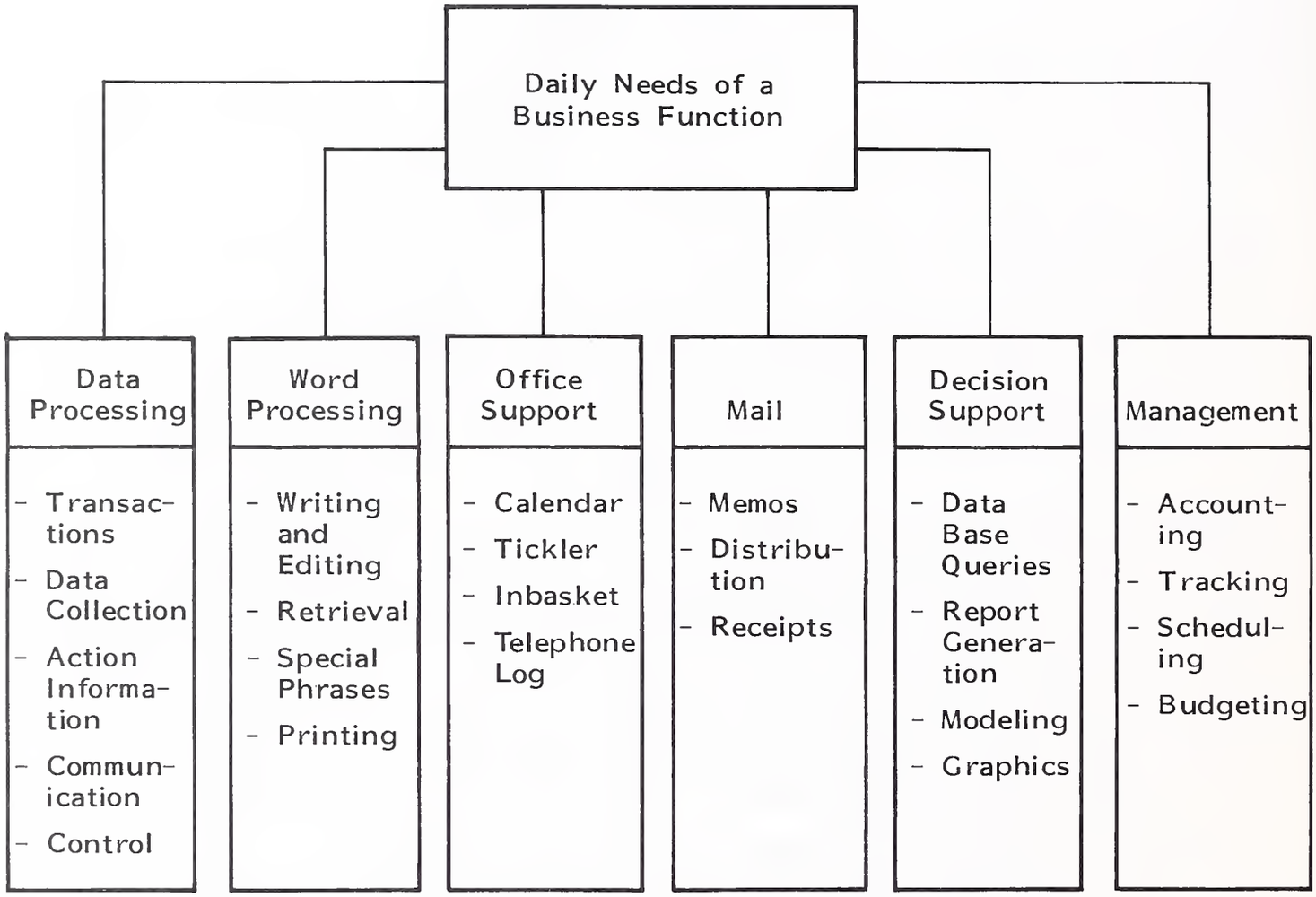


EXHIBIT III-2

END-USER ORIENTATION TOWARD DAY-TO-DAY OPERATIONAL DEMANDS



management look incompetent. Relations between IS and end users suffer, therefore.

- In the past, end users who spent a great deal of their time analyzing the factors that affect the profits and losses of an organization were easy targets for the vendors of microcomputer equipment and software. End users saw an opportunity to bypass the IS roadblocks by operating their own computers and preparing their own reports. Along with preparing their own information systems reports, end users could envision automating their office procedures and duties.

C. USERS' DATA PROCESSING NAIVETE

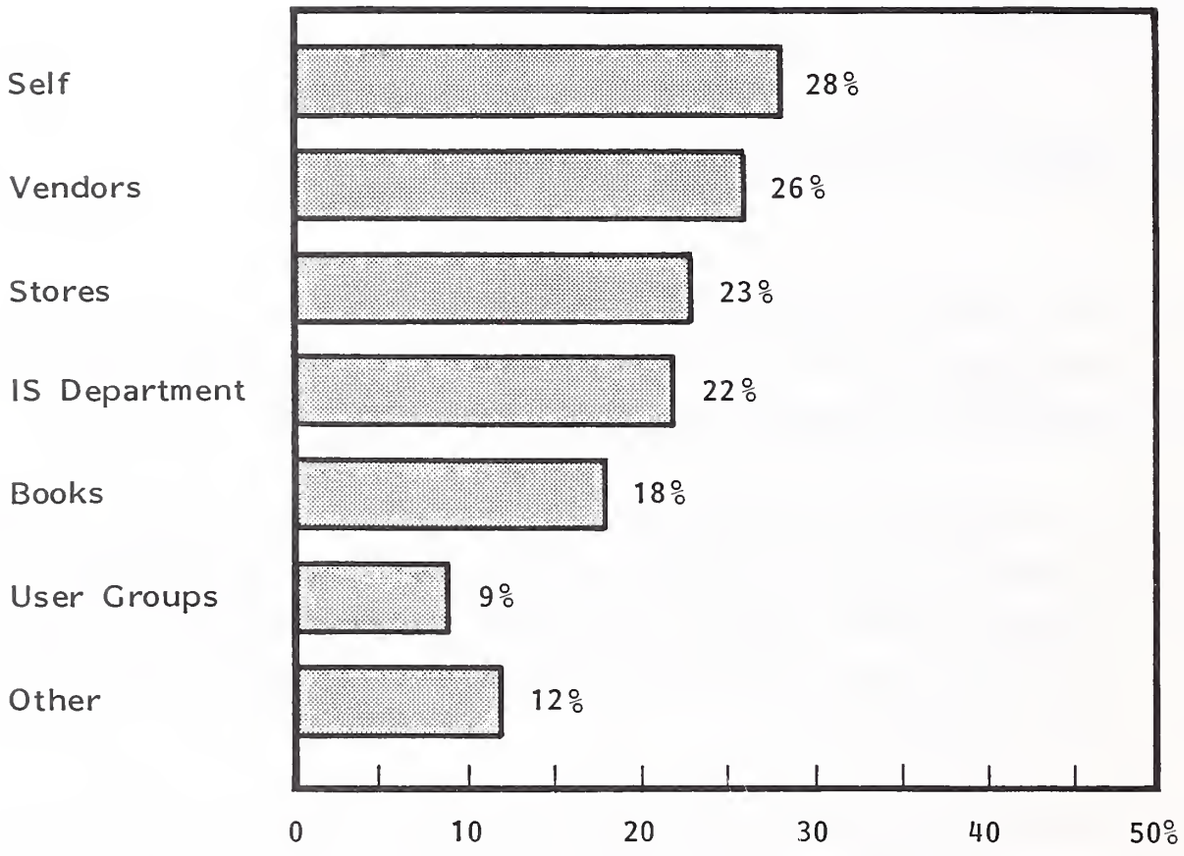
- The personal computer started finding its way to end users in the early 1980s. IS didn't give it much thought initially and probably viewed it as a means of some relief from the pressure for information.

- End users worked enthusiastically with the vendors installing and learning how to use their new computer tools. INPUT's report Personal Computers in the IS Strategy indicates that IS was considered to be in fourth place as a source of assistance for personal computer users. Some statistics from that report are shown in Exhibit III-3.

- Unfortunately, without the proper direction from IS, end users usually made incorrect assumptions about the capabilities of personal computers. Users resorted to selecting bits and pieces of data from IS reports to rekey into personal computers.

EXHIBIT III-3

SOURCES OF ASSISTANCE FOR
PERSONAL COMPUTER USERS



Note: Total is more than 100% because of multiple sources.

SOURCE: INPUT Survey

D. VENDORS' PROMISES

- One of the major issues affecting end-user computing has been reliance on vendors for assistance in building applications for the personal computer. To remain competitive, vendors have wanted to please their customers; in doing so, they have sometimes overlooked important factors such as documentation, controls, and security.

- Exhibit III-4 does not imply that every end-user computing activity requires stringent controls. As end users become more sophisticated in their applications of personal computers (including links to the mainframe and local area networks), they need to be aware of sound IS practices. Knowledge about the steps on the exhibit can come only from IS.

E. I.S. LACK OF INITIATIVE

- About three years ago IS began showing real interest in helping end users manage their day-to-day affairs. Word processing has been around for some time and office systems have been trying to get off the ground, but end-user computing didn't really take off until the concept of the information center. These centers are managed by IS and provide the tools to end users that allow them to extract data directly from the corporate data bases to perform analyses and build information models.

- IS's involvement in helping end users organize for information systems has been slow in coming, but now most IS managers realize the impact end-user computing will have on future corporate systems development.

- IBM's strategy has always been directed at bringing the capabilities of computer technology to end users. The concept of the information center was

EXHIBIT III-4

I.S. STEPS OFTEN OVERLOOKED BY END USERS AND VENDORS

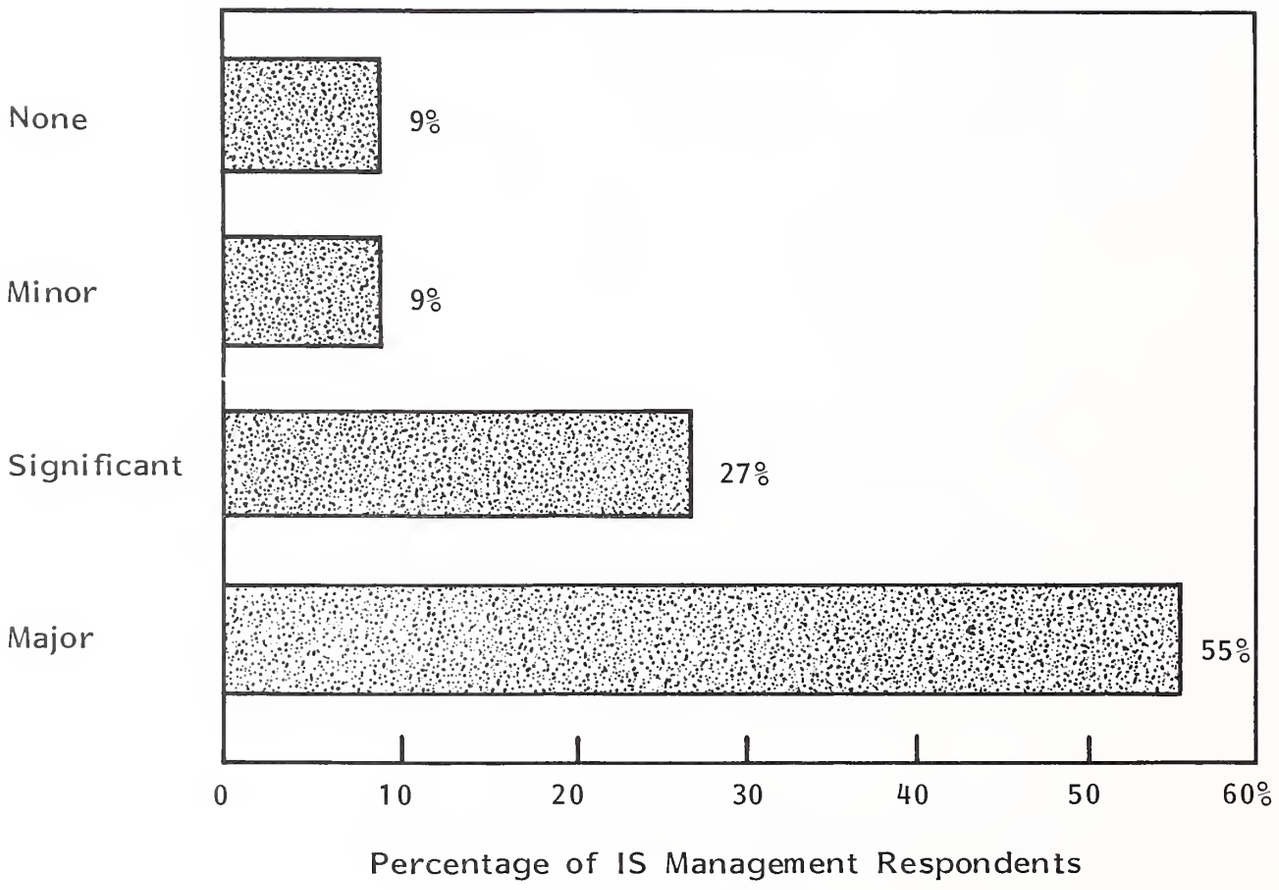
- Documentation
  - Users Manual
  - System's Description
  - I/O Formats
  - Data Files
- Controls
  - I/O and Processing
  - File and Program Backup Procedures
  - Auditing
- Security
  - Physical
  - Data Access
  - Library Maintenance
  - Software

introduced by IBM in the mid-1970s to support the long-range objective of end-user computing. IS saw the information center as an opportunity to improve its credibility by providing end users with tools that would cut through the red tape of service requests and deliver immediate results.

- As illustrated in Exhibit III-5, over 80% of the respondents believe that end-user computing will be an integral part of future corporate systems development. The following chapters will outline steps that have proven to be successful for many IS organizations in their efforts to facilitate end-user computing.

EXHIBIT III-5

IMPACT OF END-USER COMPUTING ON
FUTURE CORPORATE SYSTEMS DEVELOPMENT



IV TECHNIQUES FOR IMPROVEMENT

A. TRAINING CENTER

- INPUT's study Training Techniques for End Users points out that computer literary, operating skills, and the ability to apply computing tools to business needs are the three major goals of end-user training.

- Training can also be an excellent vehicle for IS to gain control over the direction of end-user computing, which INPUT believes is essential for the future success of information systems in any organization. The trend is toward greater user involvement in systems development and computing, which will require IS leadership.

- Exhibit IV-1 lists training and education action items for IS. INPUT's survey indicates that companies are establishing microcomputer centers along with the information center. The microcomputer center houses samples of all the IS-supported micro equipment and software products. End users are encouraged to visit the center for demonstrations, seminars, and one-on-one, hands-on training. If a company is dispersed over a wide geographic area, microcomputer centers can be placed in each major location.

- Formal courses on security and control policies and practices should also be considered, to instill these fundamentals in end users who are planning to develop their own systems.

EXHIBIT IV-1

HELPING END USERS HELP THEMSELVES THROUGH TRAINING

- Conduct Get-Acquainted Demonstrations
- Introduce New Products at Seminars
- Provide One-On-One, Hands-On Training
- Investigate Available Computer-Based Training Material
- Make Available Other IS Video and Audio-Based Training Tools

B. END-USER COMPUTING GROUP

- Thirty-five percent of the companies that are supporting end-user computing have established user groups. Forty-five percent claim to be in the process of organizing such groups.

- INPUT believes the benefits of users' groups will include the following items, summarized in Exhibit IV-2:

  - Improved resource utilization through the exchange of ideas and concepts.

  - Increased chances for compliance to compatibility standards through peer pressure.

  - Formal organization for disseminating information related to end-user computing.

  - Better acceptance of products and services through end-user involvement in their evaluation and selection.

  - Assisting IS in identifying areas for trying new products.

- INPUT recommends structuring the users' group in a similar fashion to the IBM users' groups, GUIDE and SHARE. The group should be end-user oriented; end users should comprise the group. The board of directors should consist of those end users who have had considerable computing experience. IS should take an advisory role and be asked to make presentations but should not assume any management responsibilities.

- IS should initiate this activity by calling together the end users who have been more aggressive in applying computer technology to their functions, and by presenting an outline of the bylaws for an end-user computing users' group.

EXHIBIT IV-2

THE BENEFITS OF AN INTERNAL END-USER COMPUTING ASSOCIATION

- Improves Resource Utilization
- Assists in Communicating Standards
- Facilitates Information Dissemination
- Promotes Companywide Involvement in Evaluation and Selection of Products and Services
- Facilitates Selection of Candidates for Pilot Projects

- In some large metropolitan areas, personal computer associations are established for the exchange of information. These groups should be investigated for possible membership. They would also provide an excellent source of information for the in-house user groups, both from an organizational standpoint and for topic ideas for future agenda.

C. STEERING COMMITTEE FOR END-USER COMPUTING

- Another way to aid end users in their information systems endeavors is to establish an end-user computing steering committee or review board. If there is already an active IS steering committee, investigate the possibility of including end-user computing matters in the charter.

- This group should publish a policy on the acquisition and employment of computer-related products and services that are directed toward end-user consumption. For example, if every purchase requisition for information system resources (e.g. personal computers) requires IS approval, it should be spelled out in the policy.

- The issuance of a compatibility standard, listing the preferred vendors and acceptable configurations, was selected as being of high importance to nearly all of the survey respondents. One of the duties of the steering committee could be the approval of additions to or deletions from the compatibility standard.

- Major undertakings, such as the installation of local area networks and associated office systems, should be reviewed and approved by the steering committee.

- Any alterations to the rules and regulations governing end-user computing would require the approval of this group. This would raise the authority on such matters above IS to ensure compliance and acceptance.

- Exhibit IV-3 lists the suggested membership and charter for an end-user computing steering committee. This group should consist of approximately six members, with representatives from the major areas being affected. The committee's involvement in the approval process of an end-user computing activity could be based on the cost of such an activity or on the proposed deviation from established practices.

D. IMPROVING I.S.-VENDOR RELATIONS

- Vendors of information services products will naturally try to sell their wares to those whom they believe make the decisions. IBM has been known to call on presidents of companies if it isn't making headway with the IS organizations. Suppliers of office systems and microcomputer products have been dealing mostly with the department managers whose groups are directly affected.

- INPUT believes that it is the responsibility of IS to coordinate and manage procurement activity related to computer technology. IS has the expertise in systems design and the experience in selecting the most cost-effective solutions to business problems. IS also assesses products from a global perspective to ensure compatibility and future interconnectibility.

- In order for IS to take charge of the evaluation and selection of companywide information services products it must:

  - Provide consulting services to the end users of office systems and microcomputer products.

EXHIBIT IV-3

END-USER COMPUTING STEERING COMMITTEE OR REVIEW BOARD

- Representative Members From:
  - Division Executives
  - Line Management
  - IS Management
  - Internal Audit
- Charter to Include:
  - Policy Setting
  - Changing Hardware on Approved List
  - Changing Software on Approved List
  - Cost/Benefit Analysis Reviews
  - Standards Approval
  - IS/User Dispute Arbitration
  - Capital Expenditure Approvals
- Benefits
  - Uniformity/Compatibility
  - Corporate Awareness and Control
  - Management Involvement
  - Management Authority
  - End-User Guidance

- Expound on the benefits of including IS in the procurement decisions of computer technology.

- Chapter V will point out steps that IS can take to include consulting services in its organizational structure that will encourage end users to seek assistance from IS rather than directly from the vendors.

- As a member of the steering committee for end-user computing, IS has the opportunity to initiate a policy that will clarify IS's role in the decision-making process of computer-based products. IS must share its strategic thinking with the steering committee so that the committee can review requests against an overall plan.

- Vendors should be made aware of the procurement policy of the corporation to include IS in the decision process. They should also be made aware of the opportunity of addressing a large audience of end users through the users' group if they work through IS.

- IS should coordinate the following activity for those vendors that pass a preliminary evaluation by IS:

  - Demonstrations to end users.

  - Tours of vendors' customers' facilities.

  - Pilot installations.

  - Presentations to the users' group.

  - Presentations to the steering committee.

E. IMPROVING ADMINISTRATION OF END-USER COMPUTING

- INPUT recommends that IS publish a reference manual for end-user computing. The distribution of the manual and updating material should be the same as the distribution for corporate policies and procedures. An end-user computing manual will:

  - Help end users help themselves in finding solutions to their information systems needs.

  - Ensure the dissemination of rules and regulations governing end-user computing through a formal distribution vehicle.

  - Foster uniformity and compatibility in the application of computer technology by end users.

  - Save end users' and IS support staff's time by furnishing reference material that will answer many of the questions related to end-user computing.

- The reference manual for end-user computing should include the following sections:

  - Policy statements on end-user computing that originate from the IS steering committee or senior management.

  - A list of the supported hardware vendors and equipment configurations that have been approved by the steering committee and on which IS will extend assistance.

  - A list of recommended application and utility software that has been approved by IS. The list would indicate those packages that are already in use somewhere in the organization.

- Purchase requisition procedures outlining the authorization steps required to procure any information services product and including the escalating approval steps (e.g., department head, division vice-president, steering committee) for different price ranges.

- Security and control standards, including procedures for obtaining approval to access a corporate data base, instructions for the physical security of a system, and the control procedure for software and data.

- Systems development guidelines--a condensed version of the IS systems development methodology procedures--addressing documentation standards, cost/benefit analysis, and general steps for design and development. Programming standards should also be included in this section.

- Information center procedures outlining the steps to take if an end user wants to use the information center or the microcomputer center.

- Data management procedures. Any activity related to the extraction of data from a corporate data base would be included in this section.

- Assistance request procedures, including the steps a user would follow to get consultation from IS. These procedures should help users describe the type of service they need and obtain any necessary authorization.

- Bulletins providing the means to communicate activities associated with end-user computing. If an end user discovered a unique feature of a software package, for instance, he or she could submit the findings to IS for inclusion in a bulletin.

- A sample table of contents for this manual is shown on Exhibit IV-4.

EXHIBIT IV-4

END-USER COMPUTING REFERENCE MANUAL
TABLE OF CONTENTS

- Policy Statements
- Approved Equipment Configurations
- Recommended Application and Utility Software
- Purchase Requisition Procedures
- Security and Control Standards
- Systems Development Guidelines
- Information Center Procedures
- Data Management Procedures
- Assistance Request Procedures
- Bulletins

- An IS unit assigned to end-user support should be responsible for coordinating changes to the reference manual and for the manual's distribution. In most organizations, this unit would be part of the information center.

V ORGANIZATIONAL CONSIDERATIONS

A. EXPANDING RESPONSIBILITIES OF THE INFORMATION CENTER

- Even though the concept of an information center has been around for nearly a decade, most companies that have information centers established them within the past three years. As information centers continue to evolve, they are becoming the hub of all activities associated with end-user computing.

- INPUT's study entitled Future Skills Requirements for Software Development points out that the growth rate of information centers will be 50% over the next three years. On the average, today's centers account for 6% of the IS professional personnel, and by 1987 this figure will jump to 9%.

- INPUT believes the 9% projection is conservative, because organizations are starting to place all of their end-user computing functions under the information center manager. In fact, because the scope of the information center has increased, many companies are changing the name of these centers to better describe their function: Office Technology Center, Information Resource Center, Client Support Center.

- The centers still provide end users with fourth-generation software and the ability to access corporate data base extracts for model building, analyzing, and report and graphics preparation. Office systems, timesharing services, marketing, microcomputer centers, and microcomputer strategy planning are now being added to the centers.

- IS has come to realize that in order to gain control of the end-user computing phenomenon and provide the proper leadership, it must first gain the confidence of end users. The main reason for the marketing effort is to improve customer relations by selling the capabilities of the IS facilities; education programs, tours, demonstrations, and the installation of pilot projects can all support this aim.

- The marketing function could account for 15% of the total staff devoted to supporting end-user computing. The information center's marketing staff, in addition to selling IS capabilities, must oversee the operation of the microcomputer center in which all IS-supported hardware and software can be used or evaluated by end users. This group could be the contact point for vendors of end-user products.

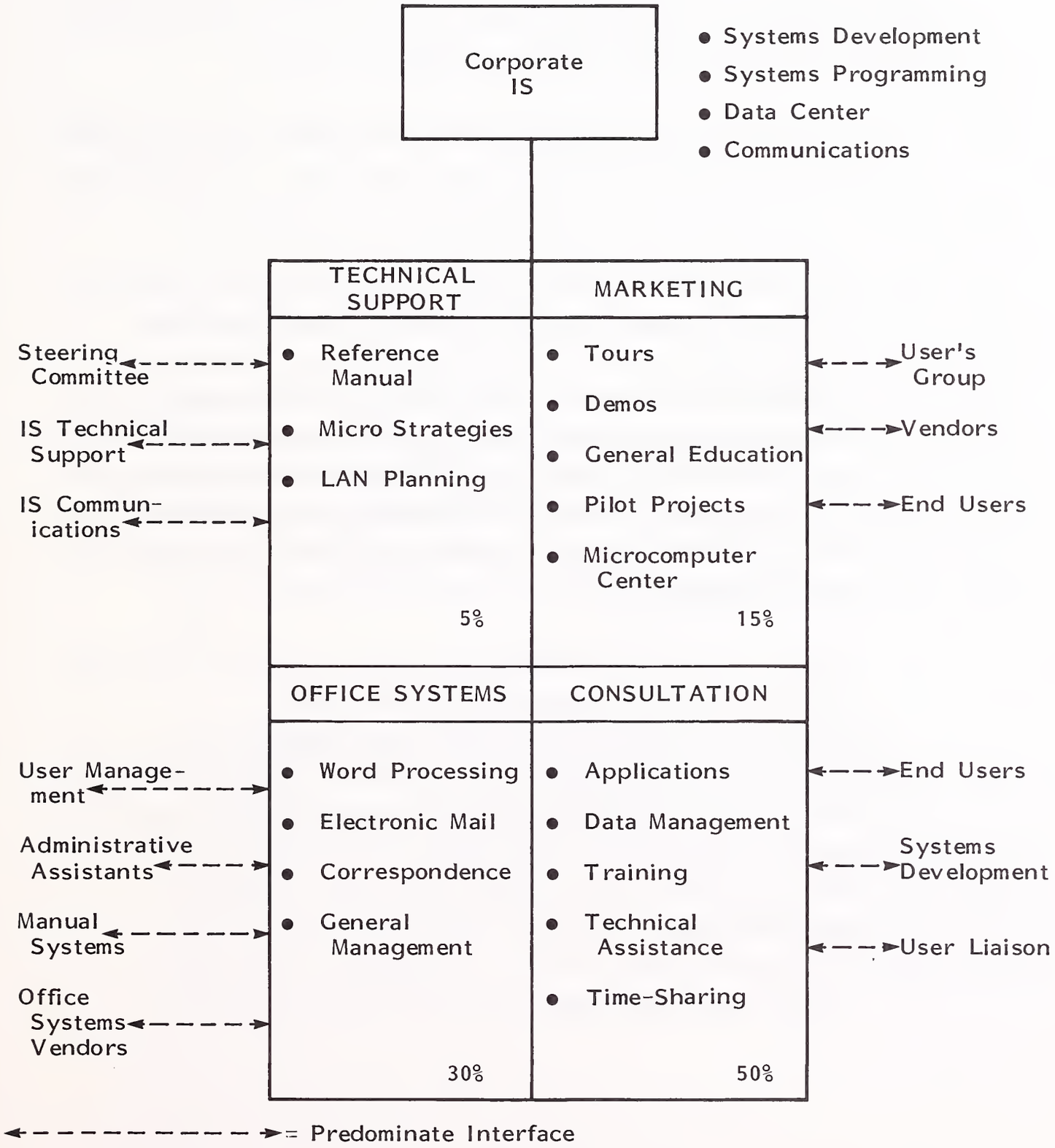
- The analysis and programming support staff of the information center is now being divided between decision support applications and office systems. Approximately 50% of the total center staff would be consultants assisting end users with the tools to create information models and analyze the information through reports and graphs. Depending on how active the corporation is in developing an office systems network, up to 30% of the staff could be directed toward this effort.

- The center for end-user computing should also have a few (5%) top technical people who would keep abreast of industry developments on which strategic plans could be established. The technical unit should be responsible for the issuance of the end users' reference manual which includes the standards, guidelines, and procedures to follow for use of the center's resources.

- The functions, staff allocations, and interfaces of the information resource center are illustrated in Exhibit V-1.

EXHIBIT V-1

THE INFORMATION RESOURCE CENTER



B. END-USER SUPPORT GROUP WITHIN I.S.

- The previous section implies that there is one corporate information resource center to which end users from all over the company come to use the computing tools and to receive assistance from the IS experts. This is true in most instances, but when an organization is dispersed over a wide geographic area, one centrally located center is not practical.

- If the organization has large operations in distant locations, there is a variety of alternatives for offering end-user computing support. The organization may:

  - Set up duplicate information resource centers at each location and have them all report to a corporate IS end-user support manager.

  - Provide the microcomputer and mainframe interface tools at each location but maintain only a skeletal staff of consultants and marketing and technical support personnel. The bulk of consultants would remain at the central IS location; the decentralized consultants would report to the central IS manager responsible for the corporate information resource centers.

  - Disperse only the supported microcomputer products to each major location and continue to operate one central center.

- INPUT believes that, regardless of how the tools are made available to end users, the following functions should be the responsibility of the corporate IS organization:

  - Micro strategies.

  - Office systems integration.

- End-user computing reference manual.
- Training and education.
- Data management.
- Timesharing services.
- Communications and network planning.

- When staffing an information resource center, keep in mind the type of duties to be performed and the variety of skills and experience needed. Exhibit V-2 lists the normal duties expected from the end-user support staff and the skills and experience that should be represented among the staff members. If there are only a few positions budgeted for end-user support, each member should possess skills that will balance out the consulting capabilities of the center. INPUT recommends the possible rotation of the systems development staff through the information resource center. Not only will this give each IS professional the opportunity to learn how to apply end-user computing tools, but it will foster the integration of these tools and methods with the traditional systems development methodologies, which INPUT believes is inevitable.

C. PROGRAMMERS AND ANALYSTS REPORTING TO END USERS

- INPUT predicts that in the future many industries will have their systems development staffs report directly to the management of each major operational function (e.g., finance, personnel, manufacturing, marketing, etc.). Many companies, especially in discrete manufacturing, have already started this trend toward decentralized systems development.

EXHIBIT V-2

I.S. END-USER SUPPORT GROUP

- Duties
  - Consulting on Applications
  - Assisting in Tool Selection
  - Analyzing Cost/Benefits
  - Advising on Security and Controls
  - Training on Working Knowledge of Tools
  - Assisting with Technical Issues
- Staffing Considerations
  - Expertise in Data Resource Management
  - Expertise in Financial Analysis and Modeling
  - Expertise in Microcomputers
  - Excellent People Skills
  - Grasp on End-User Business Problems
  - Consider Rotating Systems Development Staff

- There are several reasons why this trend is starting to make sense. For one thing, companies are relying more heavily on the acquisition of proprietary applications packages instead of building systems from scratch. This approach requires coordination by individuals who understand the need for certain systems features to support a particular business function. The operational units are in a better position to analyze the capabilities of a package than are general systems analysts. In addition, some companies are experimenting with fourth-generation languages as replacements for COBOL and PL/I in the development of standard transaction-driven systems. IS provides analysts to coordinate the effort and to make certain that security and control measures are included, but the actual design and programming is done by the line organization utilizing fourth-generation software.

- By 1990 most terminal equipment will have microprocessors to allow the user the flexibility of performing standalone computing functions as well as interfacing with mainframe systems. The terminal or workstation will also communicate with other workstations to accommodate office systems. New software will continue to become easier to use, reducing the need for programming specialists. At that point, much of the systems development activity will take place at the departmental level with technical guidance from IS. The concept of the information resource center is directing the entire computer industry toward decentralized systems development by line personnel with IS consultation. Prototyping is a good example of the trend toward end users designing their own systems.

- Some IS managers may be a bit apprehensive over the prospects of losing a large portion of their empires, and this fear can affect planning and decision making for the IS organization. However, these anxious managers are overlooking the fact that corporations within every industry will be dependent on computer technology to survive. IS has gradually been moving to the top of organizations, and IS executives have become part of corporate executive committees or advisory boards. The more computer power that is put in the

hands of end users, the more support will be required from IS. Planning, controlling, and coordinating will become the major functions of IS.

- Exhibit V-3 shows the possible distribution of information systems functions by 1990. Note that IS will retain ultimate responsibility for all aspects of technical planning, including communications and data resource management. There will be a heavy emphasis on consultation and coordination relative to the application of the technology.

- Qualifications for systems development staff located in the using departments parallel those of existing analysts or programmers. The main differences are the higher level of interest in and understanding of the business process being serviced and an increased emphasis on matching problems with the right solutions. Decentralized systems staff will be well versed in the capabilities and limitations of available mainframe and microcomputer resources. COBOL-type programming will be kept at a minimum, and there will be an increasing reliance on packaged software and fourth-generation languages. Corporate IS will provide all of the technical support related to the procurement and installation of equipment, communications requirements, security, and training.

D. COMPUTING COORDINATORS REPORTING TO END USERS

- To achieve a smooth transition from IS control of systems development to end-user developed systems, IS must be the facilitating force. IS must provide the stepping stones along this precarious path of end-user involvement in computing. This study has been dedicated to assisting IS management in identifying positive action to take to bring computer power closer to the using departments.

EXHIBIT V-3

TRENDS IN THE DISTRIBUTION OF I.S. FUNCTIONS

FUNCTION	CORPORATE INFORMATION SYSTEMS	END-USER ORGANIZATIONS
Systems Design and Development	C	PR
Applications Strategies	PR	C
Capacity Planning	PR	C
Standards and Guidelines	PR	C
Voice and Data Communications	PR	C
Information Center Support	PR	C
Data Resource Management	PR	C
Training and Education	PR	C
Application Integration	PR	C
Technical Planning and Support	PR	C
Office Systems Development	C	PR

PR = Primary Responsibility
C = Coordination/Consultation

- One further step that can be taken immediately is the assignment of analysts or coordinators to end-user departments. These persons can be transferees from IS or new personnel from outside, but they would report to line management rather than IS management. Their primary function would be to make certain the business entity was receiving an adequate level of computer support.

  - These end-user computing coordinators could be the contact points for IS during a major systems project, and they could assist end users in identifying the most effective computer-based solution to their information systems problems.

  - Coordinators should have a good working knowledge of available computer tools, including those provided by the information resource center, and mainframe capabilities and limitations.

  - The big advantage to these computing coordinators is that they become intimately familiar with the needs of the users being serviced and can devote their time to helping end users help themselves in their computing endeavors.

- As Exhibit V-4 shows, the coordinators will act as contact points for the corporate IS systems development teams and will also assist end users in identifying solutions to their individual computing needs.

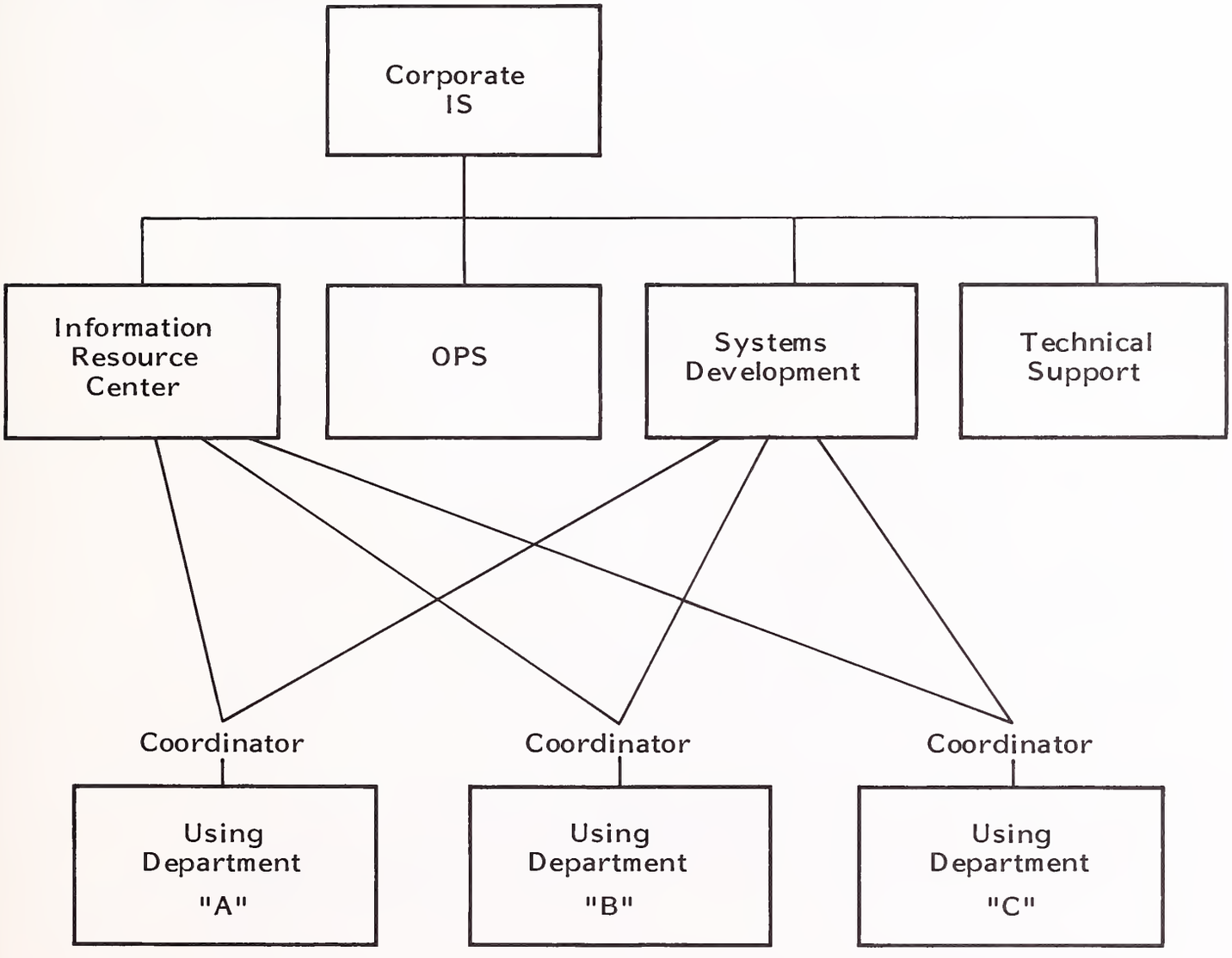
- These coordinators not only will relieve IS of some of the time-consuming IS-user relationship tasks, but also will help find the most cost-effective use of information resources. The number of coordinators necessary in an organization would depend on several factors:

  - Corporate size and composition.

  - Computing activity of each division.

EXHIBIT V-4

END-USER/I.S. COORDINATOR INTERFACE



- Level of current end-user computing.

- State of current IS-user relationships.

VI CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

- Computer technology has been expanding at such a rapid pace over the past few years that many IS managers are finding it difficult to stay abreast of the increasing number of products directed at end users. Microcomputers and office support systems have been slipping in the back door of many companies because either IS does not recognize the potential impact these systems will have on future information resources or IS believes it should not intervene in computing activities at the end-user level.

- INPUT believes the information services industry is entering an era of decentralized systems development. Because computer products, both hardware and software, are becoming easier to use, fewer programming skills will be required in the development of a business application. Systems analysts will be assigned to the individual line functions of an organization and will be responsible for coordinating all computing activities related to that function.

- The use of intelligent terminals or workstations is becoming widespread throughout organizations for performing day-to-day computing tasks of line managers and office workers.

  - They meet the personal computing needs of information modeling and analysis for decision making.

- Office systems are used for electronic mail, word processing, and administrative support.

- These machines perform data processing of business transactions, action information, and management reporting.

- IS must accept the fact that end users are going to become even more involved in solving their own information systems problems. Some companies have already made the commitment to investigate alternatives to the traditional systems development life cycle. Proprietary application software packages, fourth-generation languages, and prototyping techniques are some of the approaches considered before launching a major systems undertaking.

- As computer technology moves closer to the end user in support of all the operational duties performed at each workstation, organizations will discover a greater dependence on IS. Corporations will rely on IS management for competitive innovations more in the future than in the past.

B. RECOMMENDATIONS

- IS must not become complacent in its role of providing information services. Just because there is a multiyear backlog of requests for systems modifications or new computer applications does not mean that IS should merely plod down the proven path of systems development, ignoring the end-user computing revolution that will eventually affect all future systems development activity.

- Using departments need help in organizing their computing activities, and IS must take the initiative in providing this help. Much of the end-user computing has been brought about by default; end users have become frustrated

and impatient with IS's inability to respond to requests for service. Vendors have recognized this frustration and have sold solutions directly to end users. If left unchecked, this could result in a hodgepodge of products and approaches that would be impossible to tie together in a cohesive network.

- IS must add to its arsenal of computer-based products the items it believes will best fit in the overall scheme of end-user computing. It must then sell end users on the benefits of employing these supported products and on the benefits of seeking assistance from IS for the development of individual systems.

- Gaining control over the direction of personal computing and office systems development can be achieved through several tactics. IS can:

  - Expand the responsibility of the information center to include office systems, timesharing services, and personal computing support.

  - Market the capabilities of the information center by conducting tours, demonstrations, and training classes.

  - Help end users establish and organize an internal users' group.

  - Establish a steering committee for end-user computing.

  - Issue an end-user computing reference manual.

- As more products and services become available for the computing needs of end users, IS should consider the establishment of a liaison position in each major functional area of the organization. Liaisons would report directly to the line managers and would oversee all computing activities. This would be the first step toward decentralized systems development.

- IS's plans for a phased approach to end-user developed systems and integrated distributed data processing utilizing intelligent workstations linked to the mainframe or supermini should be reviewed with senior management at least once a year. Senior management should be aware of how IS is going to help the organization remain competitive.

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